A Japanese National Project for Thermophysical Property Measurements of Solids: Standardization for Measurements and Reference Materials

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A Japanese national project for thermophysical properties of solids started in 1997 with a five-year term consisting of more than ten participating laboratories. Major goals of the project include developing advanced measurement methods for thin films and surfaces, developing precision measurement methods for bulk materials, standardizing evaluation methods of measurement uncertainty, and establishing reference materials with identified uncertainties of property value. This paper reviews background ideas underlying the project and presents a system supporting data users with databases and measurement technology.

A new approach to standardization for thermophysical property measurements is described in detail. It specifies evaluation methods of uncertainty in measurement, instead of the measurement method itself, for major practical methods such as the laser flash diffusivity measurements, the push-rod dilatometry, and the differential scanning calorimetry. It is expected that such specifications do not block introduction of new measurement techniques but evaluate appropriately the advantages of newly developed measurement techniques. It is emphasized that reference materials with identified uncertainty of property values are especially important for evaluating uncertainty in measurement. Plans for developing reference materials in the project are also described.

A database system under development is briefly reviewed consisting of independent small-sized databases developed at individual data production and evaluation sites that are connected using a network.